AKIRA

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Air Conditional

Service Manual

MODEL:
AC-M12HG

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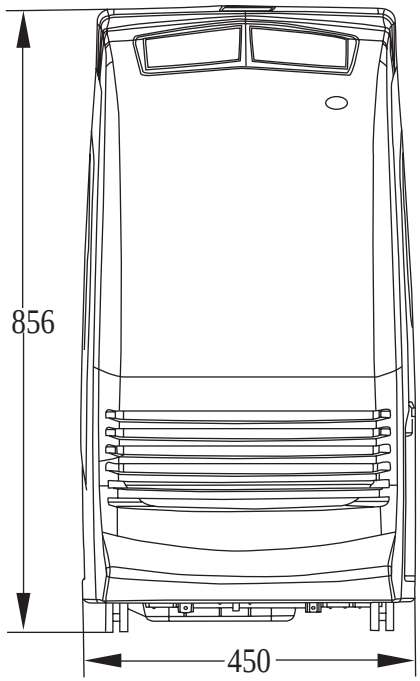
SPECIFICATION

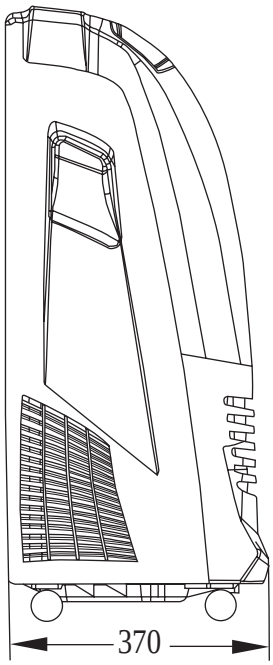
Function		Cooling /heating
Power source (PH-Hz-V)		1Ph 220~230V-50Hz
Capacity	W	2500 /2000
Power input	W	1100 /2050
Current	A	5 /9.0
Air volume	M^3 /h	355
Dehumidifying capacity	L /h	2.2
C.O.P		2.3
Upper fan speed	R/min	1100 /1020 /950
Power output	W	40
Fan capacitor	μF	2
Upper fan type-pcs		Centrifugal fan—1
Upper fan diameter length (mm-mm)		Φ 174-85
Evaporator		Tin fin copper type
Rows-distance		2-1.6
Working area		300x290mm
Swing motor		MP28GA
Power speed (W-r/min		8-4
Control type		Manual /remote control
Fuse A		3.15 /1
Working capacitor μF		0.01
Condenser		Tin fin copper type
Rows-fin distance		2-1.6
Working area		500x305
Compressor		Sealed rotated type
Model		C-RN80H5C
Power		970
Protect device	A	MST20ALU-920
Start method		P.C.S
Current		4.9
Working temp.		Discharge temp. ≤115°C
Compressor capacitor	μF	25
Lower fan speed	R/min	760
Power output	W	35

Working capacitor			2
Lower fan type-pcs			Centrifugal fan-1
Lower fan diameter-length (mm-mm)			Φ210-80
Throttling method			Capillary
Noise dB(A)			52
Dimension	Width	mm	450
	Depth	mm	370
	Height	mm	856
Net weight		Kg	45
Refrigerant			R407C
Refrigerant charge		Kg	0.63

The technical data are subject to change without notice.

OUTLINE AND DIMENSION

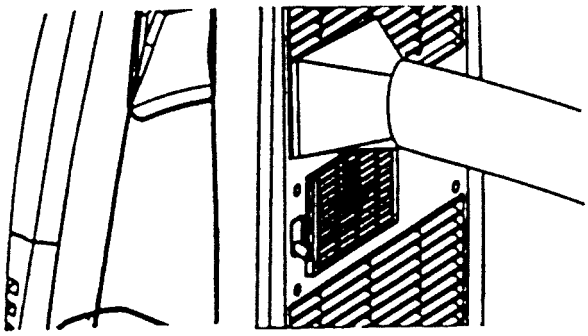




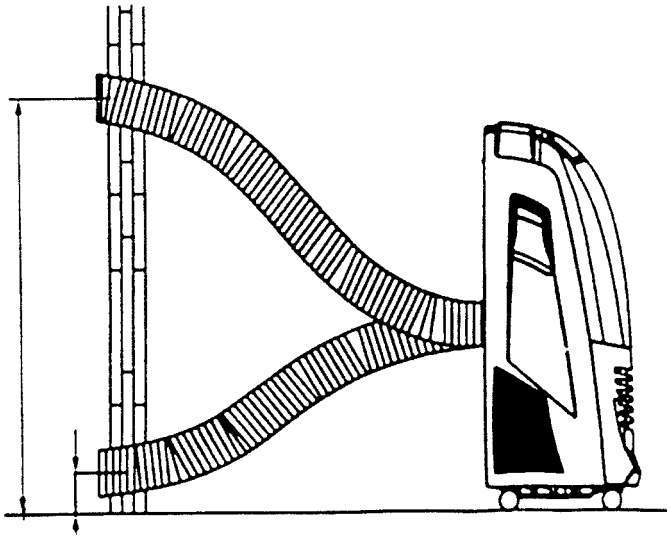
INSTALLATION GUIDE

1. Fix the square end of the exhaust duct to the exhaust terminal of the unit.
2. Put the other end (discharge) to the nearest window.

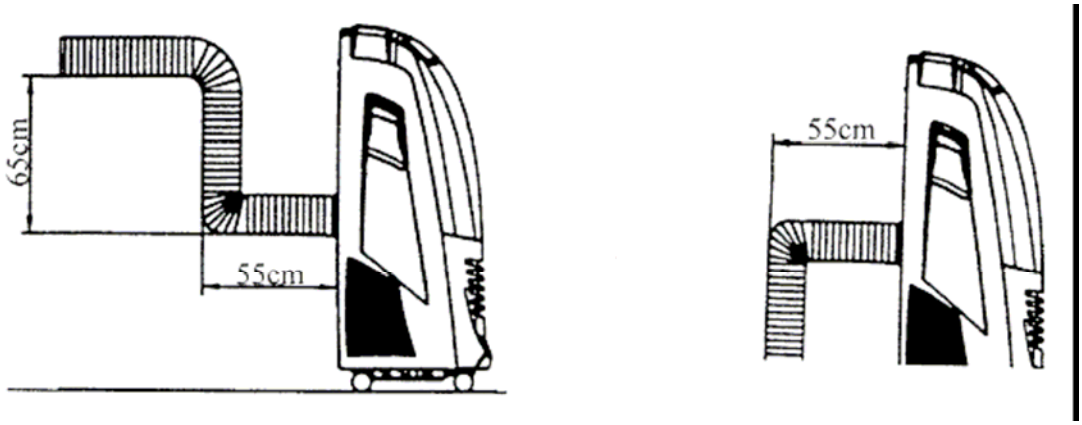
Attention:
The length of the air exhaust must be between 500mm ~ 2000mm.
When mounting, try to keep the air exhaust horizontal.



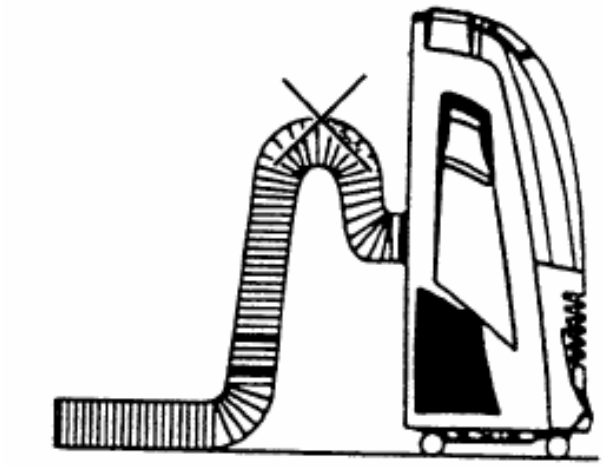
Correct mounting shown below.
(If mounting in the wall, the height of the hole should be 40cm ~ 130cm.)



If the air exhaust requires bend, bend as shown as below.



The wrong mounting diagram (Air exhaust bend too large, easily cause malfunction).



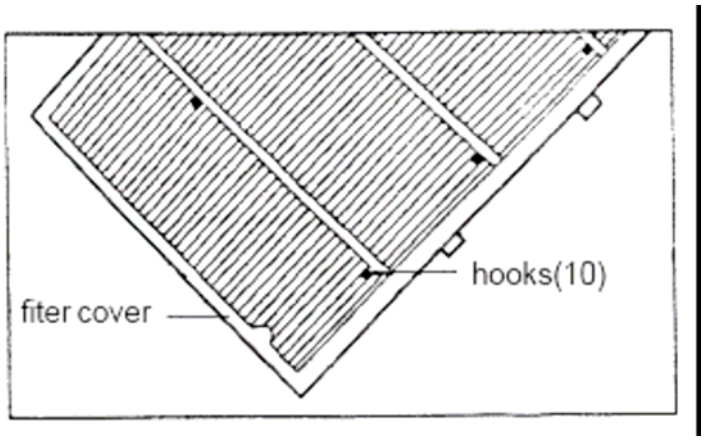
Air Filter

If the air filter is blocked with a lot of dust, the air flow volume will reduce. Clean the filter once every two weeks.

Open the air filter
Open the air cover, then take off the air filter. Take the air filter out of filter cover.

Clean
Wash the air filter by immersing it gently into warm (about 40oC) water with a neutral detergent. Rinse the filter of detergent and dry it thoroughly in a shaded place.

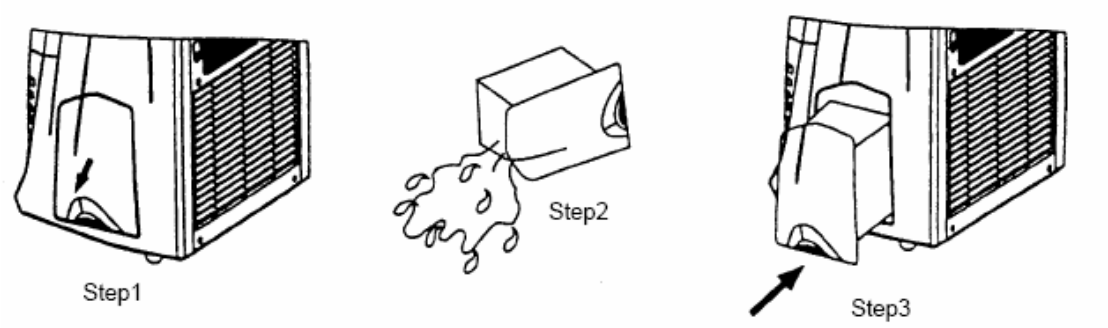
Mounting
Attach the filter to the filter cover with the attachment hooks on the inside surface of the cover. Place the hooks at the bottom of the filter cover into the holes in the case, push it back into its original position.



Water drainage

When in cooling or dehumidifying mode, the dew water will drain into the tank. When the tank gets full, the indicator will flash and the buzzer will sound eight times. LCD window shows error code “E4” at the same time the unit will switch off.

As the step shown in the figure below. Take out the water tank, pour out the water inside the tank, then push it back to its original position.

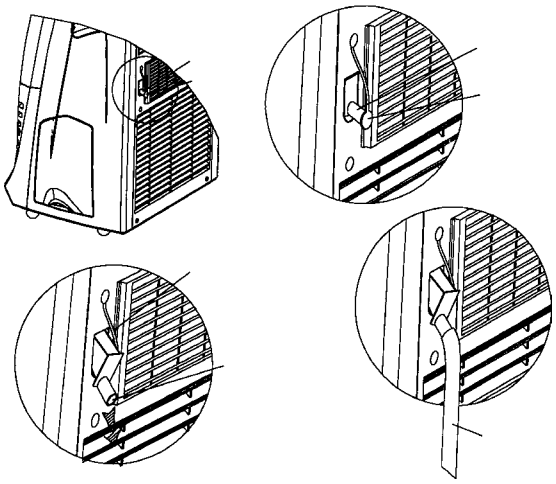


Caution

1. When in cooling or dehumidifying mode, do not take out the water tank, or the buzzer will sound and the unit will switch off.
2. If you want to take out the tank before it is full of water, please stop the machine first and wait for 3 minutes to prevent the dew water from spilling into the unit.
3. There is a plastic pipe inside where the tank is placed. Do not remove the stopper while the unit is working because the water is used for cooling the copper tube.
4. Put in the plug drainage in water drainage method.

Method of continuous drainage

1. Push down the drainage and make it inclined, pull out the plug of drainage.
2. Don't push down the drainage except for this application, other wise it will leak.
   Don't make the continuous drainage clogged.
3. Hold the drainage, then insert the pipe into continuous drainage hole.
4. Drainage
   a. When draining out water, don't press the drainage too forcefully.
   b. When draining out water, don't make bend the pipe.



PCB FUNCTIONAL MANUAL

The 4 in 1 PCB function manual of the mobile

1. Adequate models
   a. Mobile split air-conditioner about 7000Btu.
   b. Mobile air-conditioner about 7000Btu.
   c. Mobile split air-conditioner about 9000Btu.
   d. Mobile air-conditioner about 9000btu.

2. Running mode
   a. Fan
   b. Cool
   c. Dry
   d. Heat
   e. Auto

3. Controlling modes
   a. Control panel
   b. Remote control

4. The parameter to be input
   a. Analog quantity
      The ambient temperature of the indoor unit (shorten form is T_{in})
      The temperature of defrosting (shorten form is T_{de})
      The evaporator temperature of the indoor unit (shorten form is T_{eva})
      The current of the compressor (shorten form is I_{co})
   b. Switch quantity
      The switch of the higher water level
      The switch of the water level
   c. Controlled input
      By the controlling panel
      By the remote control

5. The parameter to be output
   a. Output quantity of transformer
      - ❑ Indoor fan motor (3-speed)
      - ❑ Outdoor fan motor
      - ❑ Compressor
      - ❑ Reversing valve
      - ❑ Indoor & outdoor water pump
      - ❑ Sweeping fan motor
      - ❑ Electrical heater

   b. Output quantity of LED
      - ❑ The light of the running compressor (LED 1 green)
      - ❑ The light of the buzzer (LED 2 red)

   c. Others
      - ❑ LCD
      - ❑ Buzzer

6. The basal control modes
   a. Cooling mode:
      - ❑ If $T_{in} \geq T_{set}$, cooling mode act, compressor and outdoor unit run and indoor unit run in the set speed.
      - ❑ If $T_{in} \leq T_{set} - 1^oC$, the unit will be stop from cooling mode, compressor and outdoor unit stop and indoor unit still run in the speed.
      - ❑ If $T_{set} - 1^oC < T_{in} < T_{set}$, keep running in the old mode.
      - ❑ In the cooling mode, the range of T_{set} is 16^oC ~30^oC, the initialize is 25^oC
      - ❑ LCD: 9000Btu series display “cooling”, “the set fan speed”, “T_{set}”
        12000Btu series display dynamic “the falling snow”, “the fan revolving in the set speed”, “the set fan speed”, and “T_{set}”
      - ❑ Protecting functions:
        - Avoiding freezing:
          Once the compressor works for 10min, when $T_{eva} \leq -6^oC$ for over 8sec, the compressor and the outdoor unit fan motor stop, the indoor unit fan motor run in the set speed. After the compressor stops for 3 min and $T_{eva} \geq 8^oC$, everything runs in the old speed.)

- Water pump control and the protection for the full water
  The indoor unit water pump will work when the lower water switch is close till the lower water switch open for 2 min.
  The outdoor unit water pump will work after the indoor unit water pump works for 1 min at the 1st time, the outdoor unit water pump will stop when the compressor stop and it will linkage with compressor in future.
  When the higher water switch is close, the buzzer will alarm "click, click" 8 times, LCD display the wrong code "E4" in the location of "setting temperature" (for the 9000Btu series, LED 2 flash), it means the indoor unit water pump does not work and the unit stop till the protection is canceled.
  There is no water pump in the mobile air-conditioner, 1K resistance is used to short the lower water pump. The higher water pump is close when the water tank is full, the buzzer alarm "click, click" 8 times LCD display the wrong code "E4" in the location of setting temperature" (for the 9000Btu series, LED 2 flash), it means the indoor unit water pump does not work and the unit stop till the protection is canceled.
  The indoor unit and outdoor unit water pumps do not work in the mode of fanning and heating.
- Protecting the compressor
  The distance between 2 times running won't less than 3 min once the compressor work and it will not stop by the changing of the temperature in the next 6 min. The compressor and the outdoor unit fan motor will stop when it is change from heating mode to cooling mode.
- The protection of overload current (low voltage protection)
  When the $I_{co} \geq 13A$ for 3 sec, the unit fan only (for 9000Btu series, LED 2 flash), LCD display the wrong code E1, it means the I_{co} is exceed the set current, compressor stop till the fault is canceled in 3 min.

b. Drying mode:
   The indoor unit fan motor runs in the low speed, compressor and outdoor unit fan motor run continually, the T_{set} will not be displayed and changed.
   For 9000 Btu series, it will be displayed the "drying" sign and "low speed" for 12000 Btu series, it will be displayed the picture of "water dripping" dynamic, the fan runs slowly.
   The protection functions are same as the cooling mode, for 12000 Btu series, it will be displayed the picture of "water is overflow" dynamic when the water tank is full.

c. Heating mode:

- ❑ Mobile split air-conditioner (cooling & heating)
  - If Tin ≤ T_{set} +3°C, heating mode act, reversing, compressor and outdoor unit fan motor run, indoor unit fan motor runs in the set speed and the condition of avoiding the cold wind.
  - If Tin = T_{set} +4°C keep running in the old mode.
  - If Tin ≥ T_{set} +5°C, compressor and outdoor unit fan motor stop, reserving valve is still electric, the indoor unit fan motor runs in the set speed and flow the rest heat. In the heating mode, the 4-way valve will be electroless in 2 min after the unit is turned off.
  - LCD: 9000 Btu series display the sign of heating, indoor unit fan motor speed and T_{set}. 12000 Btu series display the sun light radiate outside dynamic, the fan runs in the set speed and T_{set}.
  - Electrical heater

    When the indoor unit fan motor run in middle or high speed, T_{eva} ≤ 49°C, Tin ≤23°C, and Tin ≤ T_{set} +1°C, electrical heater work.

    When indoor unit fan motor stop or run in low speed, either T_{eva} ≥ 57°C, or T_{in} ≥ 26°C, or Tin ≥ T_{set} +4°C, electrical heater stop and restart till 2 min later.
  - The protecting functions
    - Protecting too high temperature of the compressor

      In heating mode, when T_{eva} ≥ 66°C for 8 sec, the outdoor unit fan motor stop, LCD display "E3" in the location of T_{set}. When T_{eva} ≤ 56°C, outdoor unit fan resume to run the indoor unit fan motor run in the set speed and LCD resume too.
    - The conditions of avoiding cold wind

      Once the compressor stop, the indoor unit fan motor runs in low speed and will stop too in 30 sec.
    - The conditions of flowing hot wind

      Once the compressor stop, the indoor unit fan motor runs in low speed and will stop too in 30 sec.
    - The conditions of beginning defrosting

      After the unit continue heating for 45 min and if T_{de} ≤ -8°C, the defrosting mode act, the reversal valve, the indoor and outdoor unit stop but the compressor.

      If there is electrical heater in the unit, then it will be stop first and the reversal valve, the indoor and outdoor unit stop in 1 min.

- The conditions of stopping defrosting
  After the unit continue defrosting for 10 min or if $T_{de} \geq 10^{o}C$, the defrosting stop, the reversal valve, the outdoor unit run and the indoor unit fan motor will run in the condition of avoiding the cold wind.
- The protection of overload current is same as cooling mode
  The delay of compressor
  The distance between 2 times running won't less than 3 min once the compressor work and it will not stop by the changing of the temperature in the next 6 min.
  The compressor and the outdoor unit fan motor will stop for 3 min when it is change from heating mode to cooling mode. The indoor unit fan motor run in the set speed the mode and avoiding the cold win.

❑ 12000 Btu series mobile air-conditioner with the mode cooling & heating

- If Tin $\leq T_{set} + 3^{o}C$, heating mode act, reversing, compressor, outdoor unit fan motor and electrical heater run, indoor unit fan motor runs in the set speed.
- Id Tin = $T_{set} + 4^{o}C$, keep running in the old mode.
- If Tin $\geq T_{set} + 5^{o}C$, electrical heater stop and the indoor unit fan motor will stop in 15 sec.

d. Fanning mode:
The indoor unit fan motor has 3 speeds, which are high, middle and low, it will display the T_{set} and can not be changed.
9000Btu series display the high, middle and low speed sign by the speed of indoor unit fan motor.
12000Btu series display the fanning sign same as the indoor unit fan.

e. Auto mode:
The unit run depending on the T_{in}.

❑ If $T_{in} > 26^{o}C$, cooling mode act, T_{in} is $26^{o}C$.
❑ If $26^{o}C \geq T_{in} \geq 20^{o}C$, drying mode act, indoor unit fan motor run in low speed, compressor and outdoor unit fan motor run continually.
❑ If $T_{in} < 20^{o}C$, the different unit run different mode.

- Air-conditioner with cooling and heating mode run heating mode, Tset is $20^{o}C$, if $T_{in} \geq 24^{o}C$, stop heating.

- Electrical heating run depending the conditions following:
  - If $T_{in} \leq T_{set}$, heating mode act, reversal valve, compressor and outdoor unit fan motor run together, indoor unit fan motor run in the set speed and avoiding the cold wind.
  - If $T_{set} < T_{in} < T_{set} + 2^{o}C$, the unit run in old mode.
  - If $T_{in} \geq T_{set} + 2^{o}C$, compressor, outdoor unit fan motor stop together, reversal valve is electrical, indoor unit fan motor run in the mode of flowing the hot wind.
  - If indoor unit fan motor run in middle or high speed, $T_{eva} \leq 49^{o}C$, $T_{set} \leq 23^{o}C$, and $T_{in} \leq T_{set} - 2^{o}C$, electrical heater act.
  - If either indoor unit fan motor stop or run in low speed, or $T_{eva} \geq 57^{o}C$, or $Y_{in} \geq 26^{o}C$, or $T_{in} \geq T_{set} + 1^{o}C$. Electrical heater stop and restart in 2 min.
  - The protecting function of auto-heating mode is same as heating mode.
- LCD: Its display the corresponding code of the running mode and the "AUTO" mark.

7. Others control
   a. Timer
      - ❑ Set timer to "OFF" when the unit is working and set time to "ON" when the unit is stop, the range is 2~4h, the set time will decrease 0.5h once pressing the button "V", and it will increase 0.5h once pressing the button "Λ". The button have the function of canceling "set timer".

   b. Sleep
      - ❑ If it cooling or drying, in 1 hour of the beginning, the T_{set} will be increased $1^{o}C$ and it will be increase more $1^{o}C$ in the later 2 hour, then the unit runs in this temperature.
      - ❑ If it is heating, in 1 hour of the beginning, the T_{set} will be decrease $1^{o}C$, and it will be decreased more $1^{o}C$ in the later 2 hour, then the unit runs in this temperature.
      - ❑ LCD display the "SLEEP" mark and for 12000Btu series, it display the twinkle starts.

   c. Choosing the models
      - ❑ Models are decided by the state of the chi' feet.
        - 21 foot is 12000Btu (upwards) /9000Btu (downwards)
        - 22 foot is Celsius (upwards) /Fahrenheit (downwards)
        - 20 foot is cooling & heating (upwards) /cooling only (downwards)
        - 19 foot is mobile split (upwards) /mobile (downwards)

d. LED of 12000 Btu series
   - ❑ The light of compressor running is green and it is light when the compressor is working.
   - ❑ The light of protecting is red. It will twinkle when the water tank is full or there is a overload in compressor, the frequency of twinkling is 1Hz.

e. Controlling the sweep motor
   - ❑ 9000Btu series' sweep motor is controlled by the button-sweeping, when the button is pressed once, sweep motor and will stop when it is pressed again.
   - ❑ 12000Btu series' sweeping motor revolve 85^{o} anticlockwise to open the air let at the beginning of the unit running and it revolve clockwise to close the air let when the unit is stop.

f. Testing function
   - ❑ Turn on the unit when the FAST is short circuit, LCD is light for 3 sec, press the "mode" button, there is no delay protection for compressor and others functions are all same as the normal state.
   - ❑ Turn on the unit when the FAST is shorten, if the sensor is open or short circuit, LCD display the following mark in the location of T_{set}:
     - Sensor of indoor unit is open or short, display F0
     - Sensor of evaporator is open or short, display F1
     - Sensor of deforesting is open or short, display F2

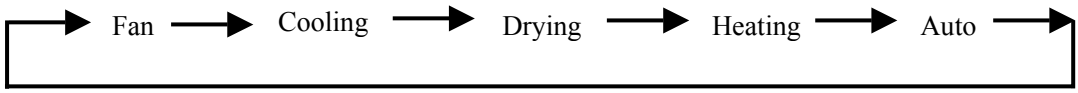
g. It can be used in the range of AC220V ± 10%.

h. There is a short circuit protecting in the circuit.

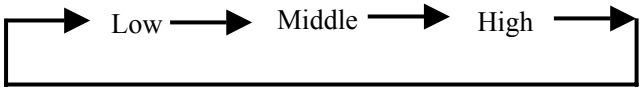
8. Buttons on the control panel

a. ON /OFF button

b. MODE button



c. Fan speed button



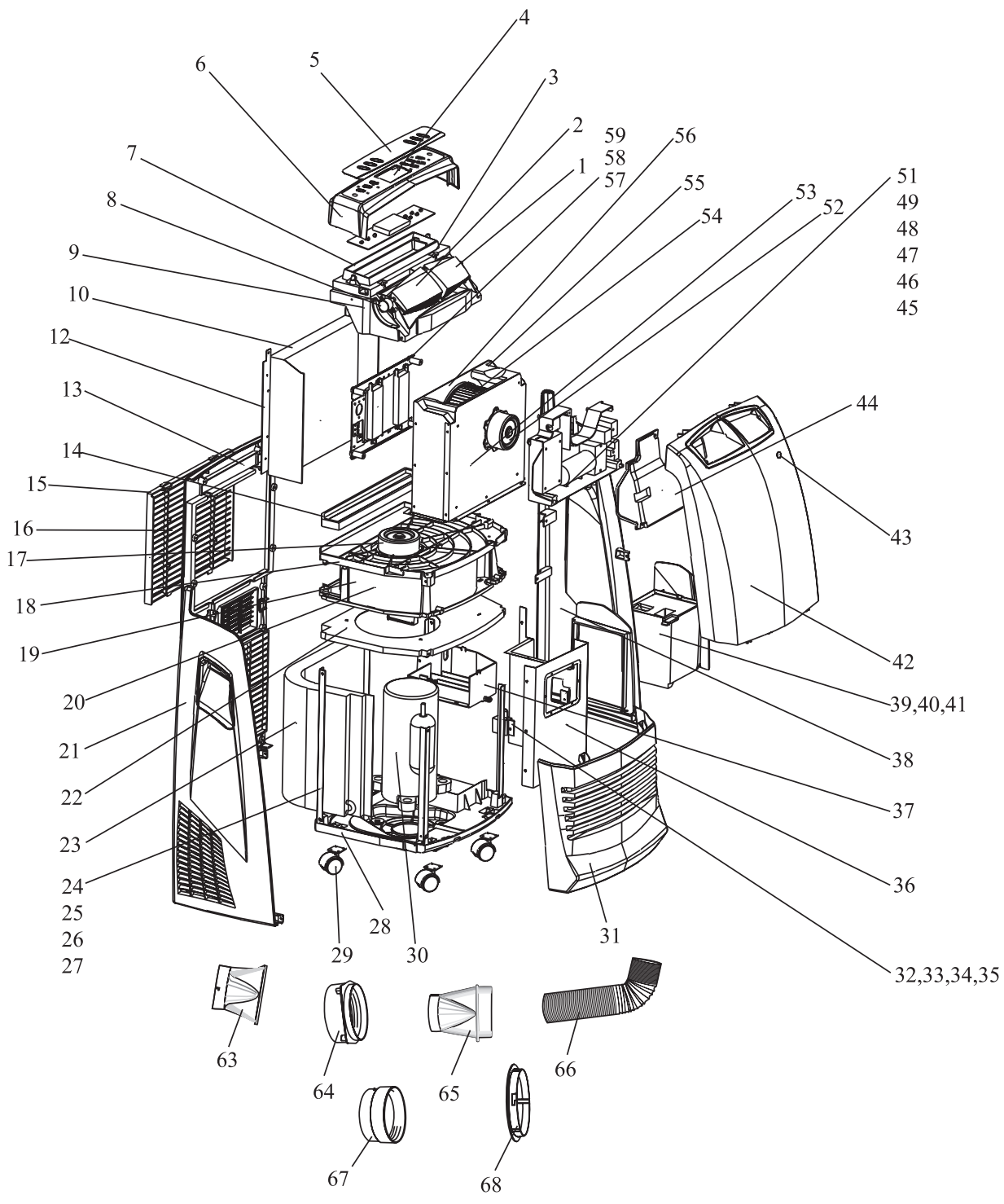
d. Timer button

The range of changing set time is 0.5 ~ 24h, the set time will be cancelled when press "V" when set time is 0.5h or press "Λ" when set time is 24h.

e. Temperature button
The range of changing set temperature is 16°C ~30°C.
f. Sleeping button
g. Sweeping button (just for 9000Btu series).

9. Design of the remote control
Y602 (Chinese) and Y612A (English, Celsius) /Y612AF (English, Fahrenheit) are be used to control 12000Btu series of mobile and split air-conditioner.

EXPLODED VIEW

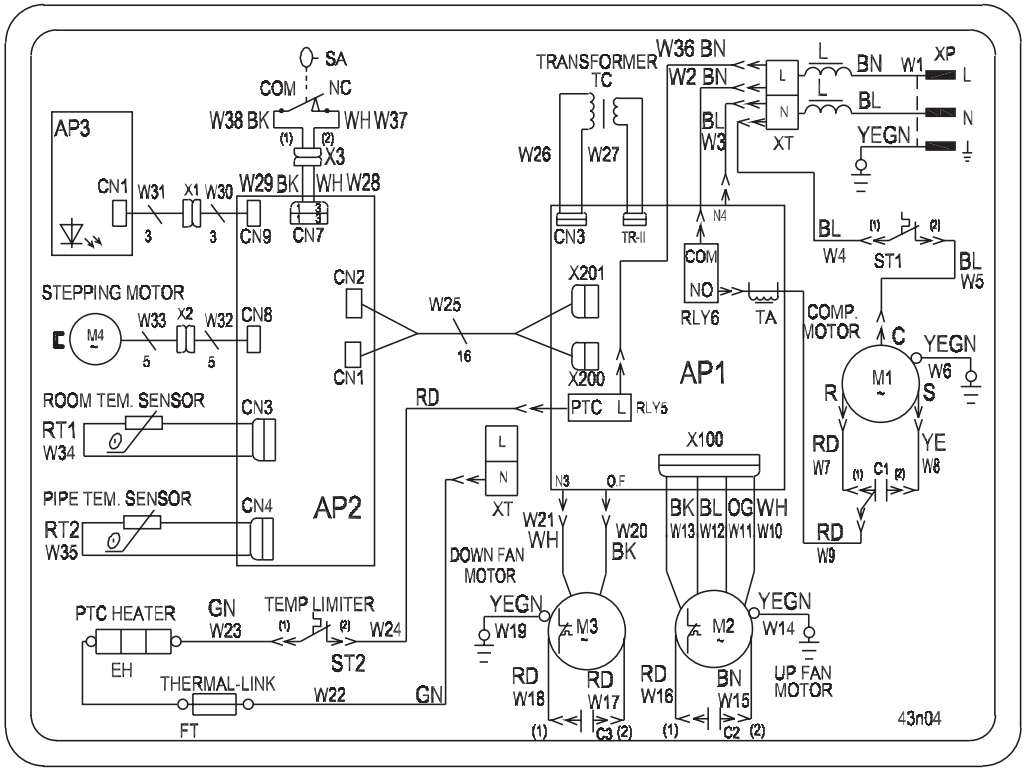


PART LIST

No	Part name	Qty
1	Air outlet grill 1	1
2	Air outlet grill 2	1
3	Screw cover	2
4	LCD slide	1
5	Membrane	1
6	LCD cover	1
7	LCD foam	1
8	Swing motor	1
9	LCD backseat	1
10	Evaporator assy	1
11	Sensor support	1
12	Rear plate	1
13	Evaporator	1
14	Air inlet grill	1
15	Filter	1
16	Hooks	10
17	Lower motor YD23B	1
18	Middle insulation plate	1
19	Lower fan	1
20	Lower propeller house	1
21	Left side plate	1
22	Lower insulation plate	1
23	Condenser assy	1
24	Support pole 1	1
25	Support pole 2	1
26	Support pole 3	1
27	Support pole 4	1
28	Base assy	1
29	Castor	4
30	Compressor C-RV167H11AB	1
31	Lower front panel	1
32	Block 1	1
33	Block 2	1
34	Switch piece	1
35	Level switch	1
36	Bottom insulation plate	1
37	Condenser tray	1
38	Right side plate	1
39	Drain tank side plate	1
40	Drain tank	1
41	Drain tank cover	1
42	Upper panel	1
43	Remote control window	1
44	Electric box cover	1
45	Electric box	1
46	Transformer SC24 (130^{o}C)	

No	Part name	Qty
47	Hi-volt board	1
	LCD board	1
	Receiving board J	1
48	Terminal board	1
49	Fan capacitor 2uF /450V	2
50	Compressor capacitor 22.5uF /450V	1
51	Magnet ring	1
52	Upper motor YD40B	1
53	Motor backseat plate	1
54	Upper fan	1
55	Upper propeller house	1
56	Flow-guide loop	1
57	PTC heater assy	1
58	Fuse	1
59	Temperature limiter 250V AC15A 55°C	1
60	Tube sensor	1
61	Room sensor	1
62	Remote control Y612A	1
63	Front plastic pipe end	1
64	Plastic pipe end	1
	Fixing ring	1
65	Rear clip	1
	Rear clip B	1
66	Pipe (Φ131)	1
67	Middle plastic pipe end	1
68	Plastic cover	1

CIRCUIT DIAGRAM



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